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| **Title:** | Deformation Behaviour and Mechanical Response of Closed-cell Cellular Materials under Projectile Impact Using Various Shapes Impactors | | |
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| **Abstract:** |  |
| Closed-cell cellular materials gained tremendous interest in their application inaerospace, shipbuilding and defence industries due to their exceptional impact energy absorption and lightweight characteristics. To assess the suitability of these materials in practical utilisation, a proper characterisation in dynamic loading is necessary. This paper investigates closed-cell aluminium foam's deformation behaviour due to low-velocity projectile impact in experimentation and finite element analysis. The collapse mechanism was numerically and empirically examined. The experiment and the finite element analysis were found to be in good agreement. The lowvelocity projectile impact tests were conducted using an instrumented drop-tower with several projectile tips with an impact energy of 105 J. Finite Element modelling using ABAQUS explicit was undertaken. The results reveal that FE modelling of true foam properties using solid geometry has a good correlation with experimental results. In this study, four impactors/indenters (flat-faced, hemispheric, conical, and truncated-conical) were used. A detailed structural collapse during the low-velocity dynamic impact has been explored with XCT data and finite element tools. | |